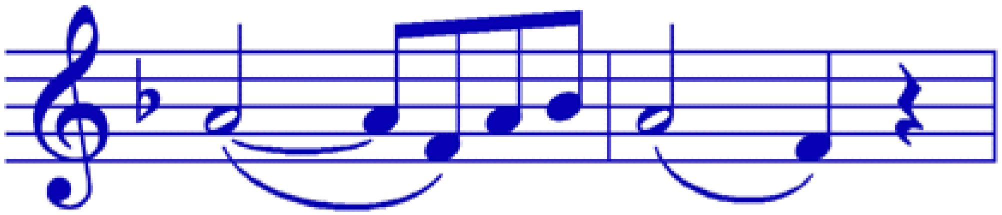
Recordare



MusicXML – An Open Format for Music Notation

Michael Good
Recordare LLC
good@recordare.com

Representing Music in Computer Formats

- Two main types of music data files
  - Audio: A recording of a musical performance, as in CDs and MP3
  - Symbolic: Underlying musical data (pitches, rhythms) as in MIDI
- This BOF is about the symbolic data, as published in music notation
- Cannot create automatically from audio

Topics

- The Need for a New Music Interchange Format
- MusicXML's Approach
- Building Support for MusicXML
- Future Directions

The Need for a New Music Interchange Format

- Music notation publication has same great Internet potential as music audio, e-books, and other publications
  - Except that each music program has its own proprietary format
  - Or the music is published as PDF images with no musical semantics
- The only common interchange format, MIDI, does not meet publication needs

Prior Attempts at Moving Beyond MIDI

- NIFF
    - Represents music data graphically, with more notation data than MIDI
    - But worse than MIDI for performance and analysis applications
- SMDL
    - General-purpose music format
    - Overly complex; never implemented commercially

MusicXML’s Approach

- A universal translator for common Western musical notation
- Supports notation, analysis, information retrieval, and performance applications
- Augments, but does not replace, specialized proprietary formats
- Adequate, not optimal, for diverse music applications

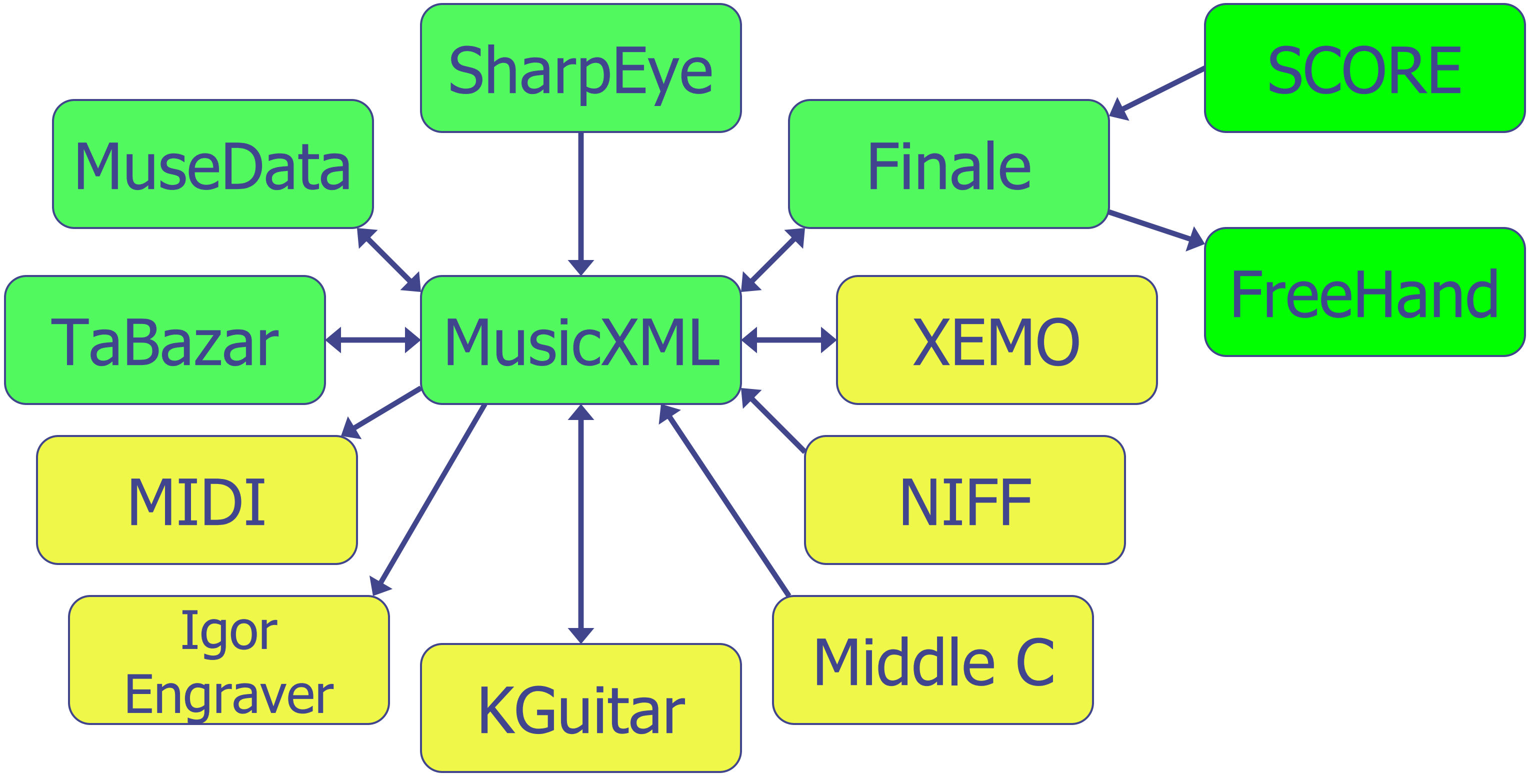
How to Succeed Where Many Have Failed

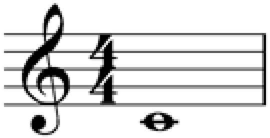
- We have an unfair advantage: XML
- MusicXML's design based on two powerful academic music formats: MuseData and Humdrum
- MusicXML definition developed iteratively with MusicXML software
- Support real music and real software

And It’s Working

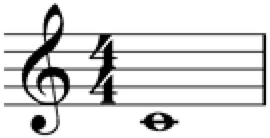
- MusicXML available under a royalty-free license modeled on W3C
- Supported by commercial programs: Finale, SharpEye Music Reader, Dolet
- Open source projects include Project XEMO and KGuitar
- Faster adoption than anything since MIDI

MusicXML Interchange Today



 in MusicXML (1 of 2)

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!DOCTYPE score-partwise PUBLIC
      "-//Recordare//DTD MusicXML 0.6b Partwise//EN"
      "http://www.musicxml.org/dtds/partwise.dtd">
<score-partwise>
   <part-list>
      <score-part id="P1">
        <part-name>Music</part-name>
      </score-part>
   </part-list>
   <part id="P1">
      <measure number="1">
```

 in MusicXML (2 of 2)

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  <divisions>1</divisions>
  <key>
    <fifths>0</fifths>
  </key>
  <time>
    <beats>4</beats>
    <beat-type>4</beat-type>
  </time>
  <clef>
    <sign>G</sign>
    <line>2</line>
  </clef>
```

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    </attributes>
    <note>
      <pitch>
        <step>C</step>
        <octave>4</octave>
      </pitch>
      <duration>4</duration>
      <type>whole</type>
    </note>
  </measure>
 </part>
</score-partwise>
```

First Steps: Recordare's MusicXML Software

- First proof of concepts with MuseData, NIFF, and MIDI
- Build a two-way translator (Dolet) for a leading commercial notation application
  - Only Finale provides an open plug-in developer's kit that can do the job
  - Sibelius ManuScript not powerful enough, and license agreement prohibits open exchange

Next Steps: Supporting MusicXML Developers

- Access to a two-way Finale translator is a powerful incentive
  - We approached SharpEye, Igor, and tab developers
  - XEMO and Middle C approached us
  - Now SharpEye import is another incentive
- Outreach and support via tutorials, web site, e-mail list, conferences, books,...

Freedom of Choice for Music Software Developers

- Previous music formats limit your choice of software tools:
  - Finale plug-ins require C or C++ code on Windows and/or Mac
  - Humdrum requires Unix knowledge
  - MuseData tools run on special TenX system
- Tight coupling of format and tools has hurt developer productivity

MusicXML
Development Environments

- XML promises that development can be done in many different environments
- MusicXML experience bears this out
  - Several developers using Java and Xerces parser on Linux, Mac OS X, and Windows
  - SharpEye software written in C, no parser
  - Recordare software developed using Visual Basic and MSXML parser on Windows

New Types of Music Use

- Electronic music stands and portable music displays
- Intelligent music accompaniment
- Music information retrieval
  - Query by humming
  - Include music semantics when searching for new music I might like
  - See http://music-ir.org

Future Directions

- Music information retrieval using XML databases and queries
- Address security issues using digital signatures or other DRM/PKI technology
- Continued adoption by music applications
- Standardization, probably via OASIS, after more implementation experience